

WHAT IS CLAIMED IS:

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1. A pseudolite comprising:  
a reference frequency oscillator;  
multiple signal generators, communicatively coupled to and  
under the control of the reference frequency oscillator, for  
generating respective coherent signals at different frequencies; and  
a transmitter antenna, communicatively coupled to the  
multiple signal generators, for transmitting the two signals at two or  
more distinct frequencies.

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2. The pseudolite of claim 1, wherein the signals are C/A  
code signals.

3. The pseudolite of claim 1, wherein the signals are from  
the same family of 1023 codes as GPS satellite signals.

4. The pseudolite of claim 1, wherein the signals are from  
the same family of 1023 codes as GPS satellite signals and are not L1  
frequencies.

5. A multi-frequency receiver comprising:  
an oscillator, defining a clock; and  
multiple GPS receivers, communicatively coupled to and  
clocked by the oscillator, for receiving L1 (1575.42MHz) GPS C/A  
code signals and signals from the same family of 1023 codes as the  
GPS satellite signals are drawn from.

6. A receiver comprising:  
multiple frequency translators, for converting signals received

3 on respective different multiple frequencies that are not a  
 4 predetermined frequency to the predetermined frequency; and  
 5 multiple GPS receivers, communicatively coupled to  
 6 respective ones of the multiple frequency translators. .

1 7. The receiver of claim **5**, wherein the predetermined  
 2 frequency is the GPS L1 frequency (1575.42MHz).

1 8. A bank of N-channel GPS receivers and attached  
 2 frequency converters with antennae located at a fixed and precisely  
 3 known (surveyed) location, called a "Reference Receiver", that measures  
 4 all of the code and carrier phase relationships between all of the signals  
 5 transmitted by all of the pseudolites in view, one or more Mobile Receivers  
 6 electronically configured the same as a Reference Receiver, and a data  
 7 link connecting the Mobile Receivers to the phase data collected by the  
 8 Reference Receiver.

1 9. A reference receiver joined with each pseudolite, data  
 2 broadcast over RF ranging signal, no requirement for separate reference  
 3 receiver and radio communications link.

1 10. A computational process for determining the carrier  
 2 phase integer ambiguities for each received pseudolite signal that is based  
 3 on the preserved and observed time and phase alignment between the  
 4 code and carrier portions of the transmitted multi-frequency pseudolite  
 5 signals.